ETSI TS 103 268-3 V1.1.1 (2017-04)

SmartM2M;
Smart Appliances Ontology and Communication Framework Testing;
Part 3: Test Suite Structure and Test Purposes (TSS & TP)

Reference

DTS/SmartM2M-103 268-3_SAP_TSS

Keywords

IoT, M2M, Smart Appliance, testing, TSS&TP

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Smart Machine-to-Machine communications (SmartM2M).

The present document is part 3 of a multi-part deliverable covering Conformance test specifications for Smart Appliances Ontology and Communication Framework Testing, as identified below:

Part 1: "Testing methodology";

Part 2: "Protocol Implementation Conformance Statement (PICS) pro forma";

Part 3: "Test Suite Structure and Test Purposes (TSS & TP)";

Part 4: "Abstract Test Suite (ATS) and Protocol Implementation eXtra Information for Testing (PIXIT)".

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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1 Scope

The present document provides the Test Suite Structure and Test Purposes (TSS & TP) for Conformance test specifications for Smart Appliances testing as defined in ETSI TS 103 268-1 [3] and ETSI TS 118 115 [5] in compliance with the relevant requirements and in accordance with the relevant guidance given in ISO/IEC 9646-7 [4].

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at https://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 103 264: "SmartM2M; Smart Appliances; Reference Ontology and oneM2M Mapping".

[2] ETSI TS 118 112: "oneM2M; Base Ontology (oneM2M TS-00012)".

[3] ETSI TS 103 268-1: "SmartM2M; Smart Appliances Ontology and Communication Framework Testing; Part 1: Testing methodology".

[4] ISO/IEC 9646-7: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[5] ETSI TS 118 115: "oneM2M; Testing Framework (oneM2M TS-0015)".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

Not applicable.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI TS 103 268-1 [3], in ETSI TS 118 112 [2] and in ISO/IEC 9646-7 [4] apply.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in ETSI TS 103 268-1 [3], ETSI TS 103 264 [1] and ETSI TS 118 112 [2] and the following apply:

API	Application Programming Interface
EUT	Equipment Under Test
IFS	Interoperable Features Statement
IUT	Implementation Under Test
IWF	InterWorking Function
PICS	Protocol Implementation Conformance Statement
QE	Qualified Equipment
RP	Reference Point
SAP	Smart Appliance
SUT	System Under Test
TP	Test Purpose
TSS	Test Suite Structure

4 Prerequisites and Test Configurations

4.1 Test Configurations

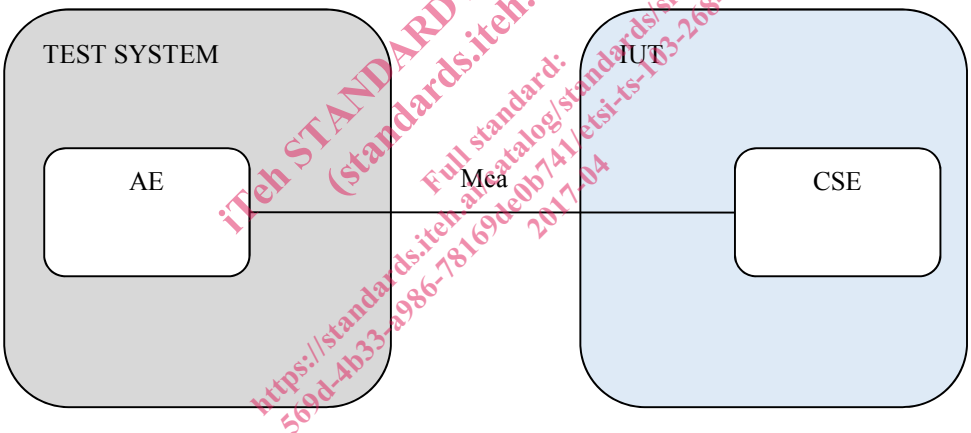

Figure 4.1-1: Test configuration 1 (CF01)

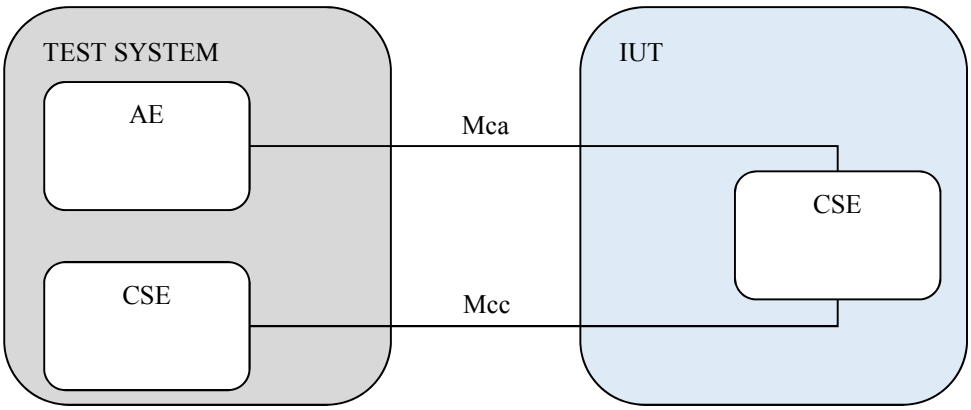

Figure 4.1-2: Test configuration 2 (CF02)

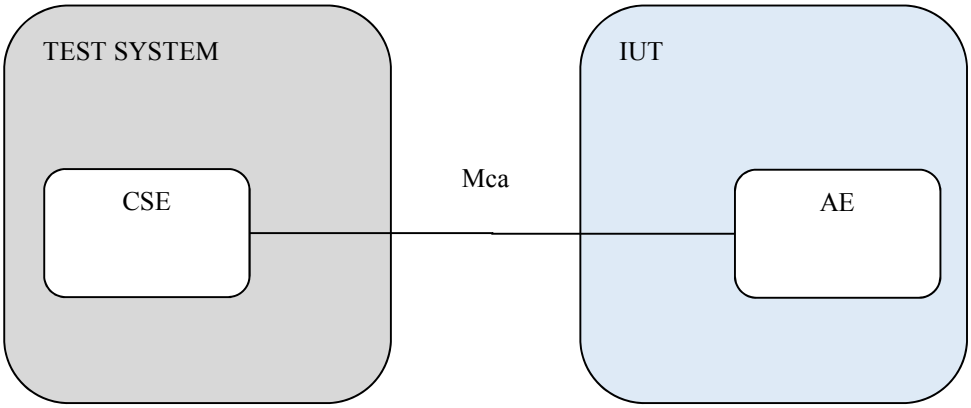

Figure 4.1-3: Test configuration 3 (CF03)

5 Test Suite Structure (TSS)

5.1 Structure for SAP tests

Table 5.1-1 shows SAP Test Suite Structure (TSS) including its subgroups defined for conformance testing.

Table 5.1-1: TSS for oneM2M

Root	Group	Sub-group	category
SAP	SAREF		Valid behaviour
			Valid behaviour
			Valid behaviour
			Valid behaviour
			Valid behaviour
			Valid behaviour

The test suite is structured as a tree with the root defined as SAP. The tree is of rank 3 with the first rank a Group, the second a Sub-group and the third a Category. The third rank is the standard ISO conformance test categories.

6 Test Purposes (TP)

6.1 Introduction

6.1.1 TP definition conventions

The TPs are defined by the rules shown in table 6.1.1-1.

Table 6.1.1-1: TP definition rules

TP Header	
TP ID	The TP ID is a unique identifier. It shall be specified according to the TP naming conventions defined in clause 6.1.2.
Test objective	Short description of test purpose objective according to the requirements from the base standard.
Reference	The reference indicates the sub-clauses of the reference standard specifications in which the conformance requirement is expressed.
PICS Selection	Reference to the PICS statement involved for selection of the TP. Contains a Boolean expression.
TP Behaviour	
Initial conditions	The initial conditions define in which initial state the IUT has to be to apply the actual TP. In the corresponding Test Case, when the execution of the initial condition does not succeed, it leads to the assignment of an Inconclusive verdict.
Expected behaviour (TP body)	Definition of the events, which are parts of the TP objective, and the IUT are expected to perform in order to conform to the base specification. In the corresponding Test Case, Pass or Fail verdicts can be assigned there.
Final conditions	Definition of the events that the IUT is expected to perform or shall not perform, according to the base standard and following the correct execution of the actions in the expected behaviour above. In the corresponding Test Case, the execution of the final conditions is evaluated for the assignment of the final verdict.

6.1.2 TP Identifier naming conventions

The identifier of the TP is built according to table 6.1.2-1.

Table 6.1.2-1: TP naming convention

Identifier:	**TP/<root>/<gr>/<sgr>/<x>/<nn>**		
	<root> = root		
	<gr> = group		
	<sgr> = subgroup		
	<x> = type of testing	BV	Valid Behaviour tests
		BI	Invalid Syntax or Behaviour Tests
		BO	Inopportune Behaviour
	<nn> = sequential number		01 to 99

6.1.3 Rules for the behaviour description

The description of the TP is built according to ETSI TS 103 268-1 [3].

6.1.4 Sources of TP definitions

All TPs are specified according to ETSI TS 103 264 [1] and ETSI TS 118 112 [2].

6.1.5 Mnemonics for PICS reference

To avoid an update of all TP tables when the PICS document is changed, table 6.1.5-1 introduce mnemonics name and the correspondence with the real PICS item number.

Table 6.1.5-1: Mnemonics for PICS reference

Mnemonic	PICS item
PICS_AE	A.5.1/1 [1]
PICS_CONTAINER	A.5.1/1 [1]
PICS_FLEXCONTAINER	A.5.1/1 [1]
PICS_GENERIC_IWK_SERVICE	A.5.1/1 [1]
PICS GENERIC_IWK_OP_INSTANCE	A.5.1/1 [1]
PICS_DEVICE	A.5.2/1 [1]
PICS_FUNCTION	A.5.3/1 [1]
PICS_ PROPERTY	A.5.5/1 [1]
PICS_ COMMAND	A.5.6/1 [1]
PICS_DEVICECATEGORY	A.5.7/1 [1]
PICS_STATE	A.5.8/1 [1]
PICS_TASK	A.5.9/1 [1]
PICS_UNITOFMESURE	A.5.10/1 [1]
PICS_COMMODITY	A.5.11/1 [1]
PICS_BUILDINGOBJECT	A.5.12/1 [1]
PICS_BUILDINGSPACE	A.5.13/1 [1]
PICS_PROFILE	A.5.14/1 [1]
PICS_FUNCTIONCATEGORY	A.5.15/1 [1]
PICS_OBJECTPROPERTY	A.5.16/1 [1]
PICS_DATATYPE	A.5.17/1 [1]
PICS_OPERATION	A.5.18/1 [1]
PICS_THING	A.5.19/1 [1]
PICS_ASPECT	A.5.20/1 [1]

6.2 Test purposes for SAP Testing

6.2.1 SAREF

TP Id	TP/SAP/SAREF/BV/001
Test objective	Check that the IUT creates for an instantiation of a *class* of the Base Ontology a oneM2M resource of type <*semanticDescriptor*> containing a descriptor attribute containing the instantiated class in RDF data.
Reference	ETSI TS 118 112 [2], clause 7.1.1.1
Config Id	CF03
PICS Selection	PICS_AE
Initial conditions	**with {** the CSE **being** in the "initial state" **and** the IUT **having** an ontology instance **containing** an instantiation of a *class* of the Base Ontology **and** the IUT **having** privileges to perform CREATE operation **}**
Expected behaviour	**Test events**
	when { the IUT **starts** and **registers** **}**
	then { the IUT **sends** a valid CREATE request **containing** To **set to** address of <AE> resource **and** Resource-Type **set to** <*semanticDescriptor*> **and** From **set to** AE-ID **and** Content **containing** <*semanticDescriptor*> resource **containing** descriptor attribute **containing** RDF data of the instantiated class **}**

TP Id	Class
TP/SAP/SAREF/BV/001_01	saref:Device
TP/SAP/SAREF/BV/001_02	saref:Door switch
TP/SAP/SAREF/BV/001_03	saref:Energy meter
TP/SAP/SAREF/BV/001_04	saref:Light switch
TP/SAP/SAREF/BV/001_05	saref:Meter
TP/SAP/SAREF/BV/001_06	saref:Sensor
TP/SAP/SAREF/BV/001_07	saref:Smoke sensor
TP/SAP/SAREF/BV/001_08	saref:Switch
TP/SAP/SAREF/BV/001_09	saref:Temperature sensor
TP/SAP/SAREF/BV/001_10	saref:Washing machine
TP/SAP/SAREF/BV/001_11	saref:Service
TP/SAP/SAREF/BV/001_12	saref:Switch on service
TP/SAP/SAREF/BV/001_13	saref:Function
TP/SAP/SAREF/BV/001_14	saref:Actuating function
TP/SAP/SAREF/BV/001_15	saref:On off function
TP/SAP/SAREF/BV/001_16	saref:Open close function
TP/SAP/SAREF/BV/001_17	saref:start stopfunction
TP/SAP/SAREF/BV/001_18	saref:Event function
TP/SAP/SAREF/BV/001_19	saref:Metering function
TP/SAP/SAREF/BV/001_20	saref:Sensing function
TP/SAP/SAREF/BV/001_21	saref:Command
TP/SAP/SAREF/BV/001_22	saref:Close command
TP/SAP/SAREF/BV/001_23	saref:Get command
TP/SAP/SAREF/BV/001_24	saref:Get current meter value command
TP/SAP/SAREF/BV/001_25	saref:Get meter data command
TP/SAP/SAREF/BV/001_26	saref:Get meter history command
TP/SAP/SAREF/BV/001_27	saref:Get sensing data command
TP/SAP/SAREF/BV/001_28	saref:Notify command
TP/SAP/SAREF/BV/001_29	saref:Off command
TP/SAP/SAREF/BV/001_30	saref:On command
TP/SAP/SAREF/BV/001_31	saref:Open command
TP/SAP/SAREF/BV/001_32	saref:Pause command
TP/SAP/SAREF/BV/001_33	saref:Set level command
TP/SAP/SAREF/BV/001_34	saref:Set absolute level command
TP/SAP/SAREF/BV/001_35	saref:Set relative level command
TP/SAP/SAREF/BV/001_36	saref:Start command
TP/SAP/SAREF/BV/001_37	saref:Step down command
TP/SAP/SAREF/BV/001_38	saref:Step up command
TP/SAP/SAREF/BV/001_39	saref:Stop command
TP/SAP/SAREF/BV/001_40	saref:Toggle command

TP Id	TP/SAP/SAREF/BV/002
Test objective	Check that the IUT creates for an instantiation of a class of the Base Ontology a oneM2M resource of type <*semanticDescriptor*> containing an Ontology-Ref attribute that identifies the instantiated class.
Reference	ETSI TS 118 112 [2], clause 7.1.1.1
Config Id	CF03
PICS Selection	PICS_AE
Initial conditions	**with {** the CSE **being** in the "initial state" **and** the IUT **having** an ontology instance **containing** an instantiation of a class of the Base Ontology the IUT **having** privileges to perform CREATE operation **}**
Expected behaviour	**Test events**
	when { the IUT **starts** and **registers** **}**
	then { the IUT **sends** a valid CREATE request **containing** To **set to** address of <AE> resource **and** Resource-Type **set to** <*semanticDescriptor*> **and** From **set to** AE-ID **and** Content **containing** <*semanticDescriptor*> resource **containing** Ontology-Ref **set to** an URI that identifies the instantiated class. **}**